

Particulate Matter (PM_{2.5}): Implementation of the 1997 National Ambient Air Quality Standards (NAAQS)

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Summary

Particulate matter (PM), including fine particulate matter (PM_{2.5}) and larger, but still inhalable particles (PM₁₀), is one of the six principal pollutants for which the U.S. Environmental Protection Agency (EPA) has set National Ambient Air Quality Standards (NAAQS) under the Clean Air Act (CAA). EPA most recently revised the particulates NAAQS in October 2006, but is due to propose revised standards in February 2011 and promulgate them by October 2011. While currently much of the interest in the particulates NAAQS is focused on reviewing the NAAQS and speculation as to the degree of stringency of any new standards, implementing revised standards can take many years. EPA and states are in the early stages of implementing the 2006 revised standards, and have not finalized implementation of the standards promulgated in 1997 after years of litigation and other delays. This report outlines the implementation process for the 1997 PM_{2.5} NAAQS and describes issues raised as EPA and states developed and employed implementation strategies for achieving attainment.

The EPA's final designation of 39 areas, consisting of 205 counties in 20 states and the District of Columbia, as "nonattainment" (out of compliance) areas for the 1997 PM_{2.5} NAAQS became effective in April 2005. A combined population of almost 90 million resides in these areas. States with PM_{2.5} nonattainment areas are required to develop comprehensive implementation plans, referred to as State Implementation Plans (SIPs), demonstrating how attainment will be reached by a designated deadline. SIPs include pollution control measures that rely on models of the impact on air quality of projected emission reductions to demonstrate attainment. States were required to submit SIPs for the 1997 PM_{2.5} NAAQS by April 2008, but EPA did not begin receiving most submissions until July 2008. On November 27, 2009, EPA published its findings that three states failed to meet the deadline for submitting complete SIPs. For the remaining designated areas, states either submitted a complete SIP or EPA made a final approval that the area attained the 1997 PM_{2.5} NAAQS based on 2006-2008 air quality data. States must be in compliance by 2010, unless they are granted an extension.

A number of issues will continue to be debated as the implementation of the 1997 PM_{2.5} NAAQS progresses. Notably, the U.S. Court of Appeals for the D.C. Circuit's July 11, 2008, decision (*North Carolina v. EPA*) to vacate the Clean Air Interstate Rule (CAIR) introduced new concerns and disruptions with respect to the implementation of the 1997 PM_{2.5} NAAQS. Implementation of CAIR would have assisted states in addressing the interstate transport (upwind state) emission contributions in achieving attainment. The court's December 23, 2008, modified decision allows CAIR to remain in effect, but only temporarily until EPA promulgates a replacement rule, which could have future implications for implementing the PM_{2.5} NAAQS. On August 2, 2010, EPA published a proposed "Transport Rule" intended to supersede the current CAIR. In addition, other promulgated and proposed EPA rulemakings that influence various aspects of regulating air quality, including EPA's 2006 changes to the particulates NAAQS, continue to impact the 1997 PM_{2.5} NAAQS implementation process.

EPA and states have encountered similar issues in implementing the 2006 revised particulates NAAQS. Whatever the outcome of the current review of the particulates NAAQS, implementation of any changes to the standards in many regards will also likely mirror the experience of EPA and states following the promulgation of the PM_{2.5} NAAQS 13 years ago.

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Introduction

National Ambient Air Quality Standards (NAAQS) are a core component of the Clean Air Act (CAA).¹ NAAQS do not regulate emission sources directly; rather, they define the level of pollution in ambient (outdoor) air above which health and welfare effects occur. The statute requires that, based on a review of the scientific literature, the Environmental Protection Agency (EPA) set (1) “primary” standards at a level “requisite to protect the public health” with an “adequate margin of safety” and (2) “secondary” standards at a level “requisite to protect the public welfare.”² NAAQS have been promulgated for six principal pollutants classified by EPA as “criteria pollutants”: sulfur oxides measured in terms of sulfur dioxide (SO₂), nitrogen dioxide (NO₂), carbon monoxide (CO), ozone, lead, and particulate matter.

This report provides an overview of the NAAQS implementation process in the context of the 1997 standards for fine particulate matter (PM_{2.5}), which consists of particles less than 2.5 micrometers in diameter. The EPA and states are in the process of finalizing the implementation of the NAAQS for particulates promulgated in 1997,³ delayed because of court challenges and other factors. The EPA’s 1997 revisions to the particulate matter standards (also referred to as the particulates NAAQS) included separate requirements for PM_{2.5} for the first time. The PM_{2.5} NAAQS have been the source of significant concern and national debate. Congress has been particularly interested in EPA’s promulgation and implementation of the CAA standards, and has held numerous hearings on particulate matter (and ozone) NAAQS established in 1997.

EPA’s and states’ experiences following the promulgation of the PM_{2.5} NAAQS 13 years ago could provide relevant insights as EPA and states encounter issues in the initial stages of implementing the PM_{2.5} NAAQS as revised in October 2006 and as the agency proceeds with its current review of the particulates NAAQS.

The 1997 PM_{2.5} Standards

Beginning in 1971, regulation and monitoring of particulate matter under the CAA focused primarily on total suspended particles (TSP) and, eventually, on coarse particles equal to or less than 10 micrometers in diameter (PM₁₀).⁴ After extensive analysis and review, EPA revised the particulates standards in 1997⁵ to provide separate requirements for fine particulate matter (PM_{2.5}) based on its links to several types of cardiovascular and respiratory health problems, including aggravated asthma and bronchitis, and to premature death.⁶

¹ Sections 108 and 109 of the CAA govern the establishment, review, and revisions of NAAQS (42 U.S.C. 7408 and 7409).

² 42 U.S.C. 7409(b)(1) for “primary”; 42 U.S.C. 7409(b)(2) and 7602(h) for “secondary.” The use of public welfare in the CAA “includes, but is not limited to, effects on soils, water, crops, vegetation, manmade materials, animals, wildlife, weather, visibility, and climate, damage to and deterioration of property, and hazards to transportation, as well as effects on economic values and on personal comfort and well-being, whether caused by transformation, conversion, or combination with other air pollutants” (42 U.S.C. 7602(h)).

³ 62 *Federal Register* 38652-38760, July 18, 1997.

⁴ 52 *Federal Register* 24634-24715, July 1, 1987.

⁵ 62 *Federal Register* 38652-38760, July 18, 1997. See also U.S. EPA Fact Sheet, *EPA’s Revised Particulate Matter Standards*, July 17, 1997, <http://www.epa.gov/ttn/oarpg/naaqsfin/pmfact.html>.

⁶ For an update of EPA’s health effects and other particulates-related research activities, see <http://www.epa.gov/pmresearch/>.

The primary (health) PM_{2.5} NAAQS requirements, which became effective on September 16, 1997,⁷ are the same as the secondary (welfare) requirements. The 1997 PM_{2.5} standards are set at

- an annual maximum concentration of 15 micrograms per cubic meter (µg/m³), based on the three-year average of the annual arithmetic mean PM_{2.5} concentrations from one or more community-oriented monitors,⁸ and
- a 24-hour maximum concentration of 65 µg/m³, based on the three-year average of the 98th percentile of 24-hour PM_{2.5} concentrations at each population-oriented monitor⁹ within an area.

Overview: Key Issues

A key component of implementing the 1997 PM_{2.5} NAAQS is EPA's designation of geographical areas for being in "attainment" (in compliance) or "nonattainment" (out of compliance) of the air quality standards for PM_{2.5}. As of August 2008, EPA's final designations included all or part of 205 counties¹⁰ in 20 states and the District of Columbia for nonattainment of the 1997 PM_{2.5} NAAQS.¹¹ A combined population of almost 90 million resides in these nonattainment areas. The final designations were based on EPA's consideration of air quality monitoring data and recommendations provided by states and tribes. The designation of nonattainment areas raised questions and concerns, particularly for those areas designated as such for the first time.

Compliance Schedule

Nonattainment designation began a process in which states (and tribes) must develop and adopt emission control programs sufficient to bring air quality into compliance by a statutorily defined deadline. States were required to submit, by April 2008, their State Implementation Plans (SIPs) for how the designated nonattainment areas will meet the 1997 PM_{2.5} NAAQS. States with nonattainment areas were to be in compliance with the 1997 PM_{2.5} NAAQS by April 5, 2010, unless they are granted an extension.¹² At the time this report was updated, EPA had not released a status of overall compliance with the 1997 PM_{2.5} NAAQS.

According to EPA, with the exception of four areas in three states, states have either submitted the complete SIPs or the agency made a final approval that an area attained the 1997 PM_{2.5}

⁷ 62 *Federal Register* 38652-38760, July 18, 1997.

⁸ Community-oriented monitoring zones are defined as "an optional averaging area with well established boundaries such as county or census block" (40 *CFR* Part 58 Subpart A).

⁹ Population-oriented monitoring (or sites) applies to "residential areas, commercial areas, recreational areas, industrial areas, and other areas where a substantial number of people may spend a significant fraction of their day" (40 *CFR* Part 58 Subpart A).

¹⁰ All designated counties and partial counties, including Indian Country, geographically located within such areas, except as otherwise indicated by EPA. See EPA's PM_{2.5} Designations website at <http://www.epa.gov/pmdesignations>.

¹¹ The EPA published a final supplemental rule on April 14, 2005 (70 *Federal Register* 19844) amending the agency's initial final designations published in the January 5, 2005, 70 *Federal Register* 944-1019, re-designating as attainment/unclassifiable 17 counties previously designated nonattainment. Subsequently, in the August 25, 2008, 73 *Federal Register* 49949, EPA announced its determination that a three-county (Harrisburg, Lebanon, Carlisle) Pennsylvania nonattainment area for the 1997 PM_{2.5} NAAQS, had achieved attainment.

¹² Under section 172(a)(2)(A) of the CAA, EPA may grant an area an extension of the initial attainment date for one to five years (in no case later than 10 years after the designation date for the area). A state requesting an extension must submit an implementation plan (SIP) by the required deadline that includes, among other things, sufficient information demonstrating that attainment by the initial attainment date is "impracticable."

NAAQS based on 2006-2008 air quality data.¹³ In November 2009, EPA issued findings that Georgia, Illinois, and Pennsylvania missed deadlines for submitting plans, or elements of plans for four nonattainment areas.¹⁴ Nonattainment areas that miss deadlines for SIP submissions or that submit inadequate SIPs can be subject to sanctions, including a suspension of federal highway funds for new projects. Highway funding sanctions would not apply to the three states if within 24 months of the effective date of the findings notice EPA determines that they have submitted the required SIPs. Based on 2006 through 2008 air quality monitoring data, EPA has indicated that 19 of the 39 nonattainment areas were meeting the 1997 PM_{2.5} standard as of June 2010.¹⁵ Under EPA's "Clean Data Policy," certain nonattainment SIP submission requirements may be suspended if the area is monitoring attainment (see 40 CFR 50.1004(c)). See the section entitled "Demonstrating Attainment with the 1997 PM_{2.5} NAAQS" later in this report for more detailed discussion of EPA's findings.

Timeliness of Implementation Guidance

Concerns were raised regarding compliance deadlines because of EPA's delay in providing implementation procedures and guidance for achieving and maintaining compliance with the 1997 PM_{2.5} NAAQS. The EPA published its final "PM_{2.5} implementation" rule on April 25, 2007.¹⁶ Six petitions for review of EPA's implementation rule were filed with the U.S. Court of Appeals for the District of Columbia (D.C.) Circuit,¹⁷ and two petitions for reconsideration were filed with EPA.¹⁸ Given that states were required to submit their SIPs by April 2008, state and local air pollution control agencies,¹⁹ as well as some Members of Congress,²⁰ had expressed their concerns about the delays in publishing a final implementation rule²¹ and the lack of guidance.

¹³ Information provided to CRS by EPA's Office of Air Quality and Planning, April 2010.

¹⁴ The nonattainment areas are Atlanta (Georgia), St. Louis (Illinois portion only), and Liberty-Clairton (Pennsylvania) and Philadelphia-Wilmington (Pennsylvania portion only), 74 *Federal Register* 62251-62255, November 27, 2009; see also the fact sheet on EPA's website at <http://www.epa.gov/air/particlepollution/actions.html>.

¹⁵ EPA identifies areas through clean data/attainment determinations published in the *Federal Register*. Notices are available on EPA's "Green Book: Particulate Matter (PM_{2.5}) Nonattainment Areas (1997 Standard)" website at <http://www.epa.gov/oar/oaqps/greenbk/qfmrpt1.html>.

¹⁶ 72 *Federal Register* 20586-20667, April 25, 2007.

¹⁷ The six petitions are Earthjustice on behalf of American Lung Association, National Resources Defense Council, Sierra Club and Medical Advocates for Healthy Air (*American Lung Association v. EPA*, No. 07-1233, D.C. Cir. filed June 26, 2007); National Environmental Development Association's Clean Air Project (NEDA CAP); National Petrochemical & Refiners Association; state of New York; state of New Jersey; National Cattlemen's Beef Association. Litigation from the parties is stayed pending resolution of two petitions for reconsideration.

¹⁸ Earthjustice, Petition for Reconsideration, *Final Clean Air Fine Particle Implementation*, filed before the Administrator of the U.S. Environmental Protection Agency, June 25, 2007, (Docket #EPA-HQ-OAR-2003-0062-0256 available at <http://www.regulations.gov/search/index.jsp>); and petition by the National Cattlemen's Beef Association (based on information received by CRS from EPA's Office of Air Quality Planning and Standards, March 19, 2008).

¹⁹ Letter of Shelley Kaderly and Ursula Kramu, Co-Presidents, the National Association of Clean Air Agencies (NACAA, formerly the State and Territorial Air Pollution Program Administrators and the Association of Local Air Pollution Control Officials (STAPPA/ALAPCO)), to Hon. Stephen L. Johnson, EPA Administrator, February 16, 2007, available at <http://www.4cleanair.org/TopicDetails.asp?parent=2#Particle%20Pollution>.

²⁰ Letter of the Hon. John D. Dingell, Chairman of the House Committee on Energy and Commerce, to Hon. Stephen L. Johnson, EPA Administrator, January 19, 2007, http://energycommerce.house.gov/Press_110/110pr_air_quality.shtml.

²¹ The EPA had published a proposed rule November 1, 2005 (70 *Federal Register* 65984).

The Clean Air Interstate Rule (CAIR) and Other Federal Requirements

The EPA concluded that, in many cases, implementing national strategies—including the 1999 visibility protection regulations (Regional Haze Rule);²² voluntary diesel engine retrofit programs; and federal standards scheduled to be implemented between 2004 and 2010 on cars, light trucks, heavy-duty, and nonroad diesel engines—would provide a framework for achieving attainment with the 1997 PM_{2.5} NAAQS. The EPA’s May 2005 final rule, the Clean Air Interstate Rule (CAIR),²³ was expected to serve as the primary tool to assist downwind states in meeting the PM_{2.5} (and eight-hour ozone) NAAQS by mitigating interstate transport of sulfur dioxide (SO₂) and nitrogen oxide (NOx) emissions from electric generating units that contribute to the formation of PM_{2.5}.²⁴ CAIR covered 28 states in the eastern United States and the District of Columbia, including 26 jurisdictions in the PM_{2.5} nonattainment region. As a preferred implementation strategy, EPA encouraged states to use a trading program to reduce emissions of target pollutants by up to 70% in a cost-effective manner.²⁵

In a July 11, 2008, decision (*North Carolina v. EPA*), the U.S. Court of Appeals for the D.C. Circuit vacated CAIR,²⁶ initially causing some states to reconsider implementation plans (SIPs) already submitted and pending submission for achieving or maintaining attainment with 1997 PM_{2.5} NAAQS.²⁷ The D.C. Circuit subsequently modified its decision on December 23, 2008,²⁸ in response to an EPA motion,²⁹ reversing its decision to vacate CAIR while EPA develops a replacement rule. The Circuit, however, left the substantive requirements of its July 2008 decision fully intact. That decision strongly suggests that there is no simple “fix” that would make CAIR acceptable to the court. The court’s decision to vacate the rule drew the interest of some Members of Congress and was the subject of a July 29, 2008, congressional hearing.³⁰

On August 2, 2010, EPA published a proposed “Transport Rule” intended to supersede the current CAIR.³¹ The proposed rule would limit sulfur dioxide (SO₂) and nitrogen oxide (NOx) emissions

²² 64 *Federal Register* 35714-35774, July 1, 1999. See CRS Report RL32483, *Visibility, Regional Haze, and the Clean Air Act: Status of Implementation*, by Larry Parker and John Blodgett; also CRS Report RL32927, *Clean Air Interstate Rule: Review and Analysis*, by Larry Parker.

²³ Promulgated under the CAA, 42 U.S.C. 7401 et seq., 70 *Federal Register* 25162, May 12, 2005.

²⁴ Sulfur dioxide (SO₂) is a precursor (a pollutant that is transformed in air to form another air pollutant) contributing to the formation of PM_{2.5}, and NOx is a precursor contributing to the formation of both ozone and PM_{2.5}. EPA has concluded that SO₂ and NOx emissions, through the phenomenon of air pollution transport, contribute significantly to downwind nonattainment, or interfere with maintenance, of the PM_{2.5} and eight-hour ozone NAAQS (70 *Federal Register* 25162, May 12, 2005).

²⁵ See EPA’s CAIR website at <http://www.epa.gov/airmarkets/progsregs/cair/index.html>.

²⁶ 531 F.3d 896 (D.C. Cir. 2008).

²⁷ For a more detailed discussion of the court’s decision and its implications, see CRS Report RL34589, *Clean Air After the CAIR Decision: Multi-Pollutant Approaches to Controlling Powerplant Emissions*, by James E. McCarthy, Larry Parker, and Robert Meltz.

²⁸ 550 F.3d 1176 (D.C. Cir. 2008).

²⁹ EPA requested reconsideration on September 24, 2008, with suggestion for rehearing by the entire court. Alternatively, EPA requested that the CAIR rule be allowed to continue in effect while the agency developed a replacement program that satisfied the court’s July 2008 decision. The Natural Resources Defense Council (NRDC), the National Mining Association, and the Utility Air Regulatory Group also petitioned the court for a rehearing.

³⁰ Senate Committee on Environment and Public Works, Subcommittee on Clean Air and Nuclear Safety, hearing, “EPA’s Clean Air Interstate Rule (CAIR): Recent Court Decision and its Implications,” July 29, 2008, <http://epw.senate.gov/public/>.

³¹ 75 *Federal Register* 45210-45565, August 2, 2010. See also U.S. EPA, “Air Transport” website at <http://www.epa.gov/airtransport/actions.html#jul10>. EPA announced the release of the proposal on July 6, 2010.

from electric generating units within 31 states in the eastern United States and the District of Columbia that affect the ability of downwind states to attain and maintain compliance with the 1997 and 2006 PM_{2.5} and the 1997 ozone NAAQS. The proposal includes modifications in response to the Court's concerns, particularly with regard to certain aspects of emissions contributing to ozone.³² The implications of this proposal have already generated considerable debate among states, industry, and other stakeholders, and have been the topic of further deliberation by Congress. The Senate Committee on Environment and Public Works Subcommittee on Clean Air and Nuclear Safety held a hearing on EPA's proposed alternative transport rule on July 22, 2010.³³ EPA has scheduled three public hearings,³⁴ and comments on the proposal must be received on or before October 1, 2010.

EPA's 2006 Revisions to the PM NAAQS³⁵

Further complicating issues associated with achieving attainment of 1997 PM_{2.5} NAAQS, EPA promulgated revisions to the NAAQS for particulate matter on October 17, 2006,³⁶ primarily a tightening of the 1997 standard for PM_{2.5}.³⁷ On November 13, 2009, EPA published its designations of 31 areas in 18 states, comprising 120 counties (89 counties and portions of 31 additional counties), for nonattainment of the revised 2006 24-hour PM_{2.5} standard.³⁸ The final designations, based on 2006 through 2008 air quality monitoring data, include counties that would be designated nonattainment for PM_{2.5} for the first time, but the majority of the counties overlap with EPA's final nonattainment designations for the 1997 PM_{2.5} NAAQS. Most of the 1997 PM_{2.5} nonattainment areas were *only* exceeding the *annual* standard; only 12 counties were exceeding both the 24-hour and the *annual* standards. Thus, tightening the 24-hour standard resulted in an increased number of areas being designated nonattainment based on exceedances of both the 24-hour and the *annual* standard.

The EPA had urged states to consider control strategies that may be useful in attaining the 2006 revised PM_{2.5} NAAQS when developing control strategies for the 1997 PM_{2.5} standards.³⁹ The

³² According to the fact sheet accompanying the proposal, EPA plans to propose a separate transport rule to address the 2010 ozone standard in 2011 (see footnote 31).

³³ Senate Committee on Environment and Public Works, Subcommittee on Clean Air and Nuclear Safety hearing: "Oversight: EPA's Proposal for Federal Implementation Plans to Reduce Interstate Transport of Fine Particulate Matter and Ozone," July 22, 2010, <http://epw.senate.gov/public/index.cfm?FuseAction=Hearings.Home>. EPA announced the release of the "Air Transport Rule" on July 6, 2010, but it was not published in the *Federal Register* until August 2, 2010.

³⁴ The hearings will be held on Thursday, August 19, 2010, in Chicago, Illinois, on Thursday, August 26, 2010, in Philadelphia, Pennsylvania, and on Wednesday, September 1, 2010, in Atlanta, Georgia, 75 *Federal Register* 45075-45076, August 2, 2010.

³⁵ Section 109(d)(1) of the CAA. According to the statute, EPA is required to review the latest scientific studies and either reaffirm or modify the NAAQS every five years, but reviews have occurred less frequently in practice. See CRS Report RL34762, *The National Ambient Air Quality Standards (NAAQS) for Particulate Matter (PM): EPA's 2006 Revisions and Associated Issues*, by Robert Esworthy and James E. McCarthy.

³⁶ 71 *Federal Register* 61143-61233, October 17, 2006.

³⁷ The new daily standard averaged over 24-hour periods is reduced from 65 micrograms per cubic meter (µg/m³) to 35 µg/m³ (71 *Federal Register* 61143-61233, October 17, 2006).

³⁸ 74 *Federal Register* 58688-58781, November 13, 2009; see also EPA's website, "Area Designations for 2006 24-Hour Fine Particulate (PM_{2.5}) Standards—Regulatory Actions," <http://www.epa.gov/pmdesignations/2006standards/regs.htm#4>. See CRS Report R40096, *2006 National Ambient Air Quality Standards (NAAQS) for Fine Particulate Matter (PM_{2.5}): Designating Nonattainment Areas*, by Robert Esworthy.

³⁹ EPA's Advanced Notice of Proposed Rulemaking outlining an implementation plan for the transition to the January 17, 2006, proposed particulates NAAQS (71 *Federal Register* 6722, February 9, 2006).

effective date of the final designations rule is December 14, 2009, 30 days from the date of publication in the *Federal Register*. Following formal designation, the states have three years to submit SIPs,⁴⁰ and are required to meet the 2006 revised PM_{2.5} NAAQS no later than five years from the date of designation unless granted an extension.⁴¹ Further delays in implementing the 1997 NAAQS could result in some stakeholders advocating moving directly to implementation of the 2006 standards.

EPA's next round of the periodic review of the particulates NAAQS is under way. The agency announced its intention to accelerate the review, in part in response to a February 24, 2009, decision by the U.S. Court of Appeals for the D.C. Circuit⁴² to grant petitions challenging certain aspects of the EPA's revised NAAQS, denying other challenges. The court's decision did not vacate the PM standards but remanded certain aspects of the annual PM_{2.5} standard to EPA for reconsideration. EPA has targeted proposing any changes to the standards by February 2011, and October 2011 for final standards.⁴³ Potential risk reduction estimates and initial staff recommendations reported in recently released draft EPA assessments⁴⁴ and an April 2010 review by the members of the current CASAC⁴⁵ suggest the evidence supports further strengthening of the NAAQS for fine particulates. In the April 2010 review of EPA's draft assessment, members of the CASAC agreed that the evidence suggests the need for stricter PM_{2.5} standards to adequately protect human health. The issue of whether particulates NAAQS should be strengthened or not, findings and recommendations included in EPA's assessments, and the implications with regard to the ongoing implementation of the 1997 PM_{2.5} NAAQS will likely be subject to extensive comment and debate.

⁴⁰ See EPA's guidance on its website: "Area Designations for 2006 24-Hour PM_{2.5} NAAQS—Technical Information," http://www.epa.gov/ttn/naaqs/pm/pm25_2006_techinfo.html.

⁴¹ Under section 172(a)(2)(A) of the CAA, EPA may grant an area an extension of the initial attainment date for one to five years (in no case later than 10 years after the designation date for the area) if a state demonstrates that severe air quality conditions prevent achieving attainment within the five years after designation. A state requesting an extension must submit an implementation plan (SIP) by the required deadline that includes, among other things, sufficient information demonstrating that attainment by the initial attainment date is "impracticable."

⁴² *American Farm Bureau Federation v. U.S. EPA*, No. 06-1410 (D.C. Cir., February 24, 2009).

⁴³ See page 45220 of the EPA Proposed Rule: Federal Implementation Plans to Reduce Interstate Transport of Fine Particulate Matter and Ozone, or "Proposed Transport Rule," as published in 75 *Federal Register* 45210–45465, August 2, 2010.

⁴⁴ EPA, Integrated Science Assessment for Particulate Matter (Final Report) (EPA/600/R-08/139F, December 2009), and Risk Assessment to Support the Review of the PM Primary National Ambient Air Quality Standards—External Review Draft (EPA 450/P-09-006, September 2009); 74 *Federal Register* 46589–46591, September 10, 2009. Both assessments are available at http://www.epa.gov/ttn/naaqs/standards/pm/s_pm_2007_fr.html. See also Policy Assessment for the Review of the PM NAAQS - First External Review Draft (EPA 452/P-10-003, March 2010), available at http://www.epa.gov/ttn/naaqs/standards/pm/s_pm_2007_pa.html.

⁴⁵ EPA Clean Air Scientific Advisory Committee (CASAC) Public Teleconference to review the Policy Assessment for the review of the Particulate Matter NAAQS (First Draft, March 2010), April 8-9 2010, <http://yosemite.epa.gov/sab/sabproduct.nsf/0/8bee96ad3228eabe8525760400702786!OpenDocument&TableRow=2.3#2>. See also CASAC's *Deliberative Draft Letter on the Quantitative Health risk Assessment for Particulate Matter (second External Review Draft)*, March 30, 2010, <http://yosemite.epa.gov/sab/sabproduct.nsf/WebReportsbyTopicCASAC!OpenView&Start=1&Count=1000&Expand=1.8.1#1.8.1>.

Geographical Area Designation Process

The NAAQS Designation Process⁴⁶

The designation of geographical areas failing to comply with the NAAQS, based on monitoring and analysis of relevant air quality data, is a critical step in NAAQS implementation. The CAA establishes a process for designating nonattainment areas and setting their boundaries, but it allows the EPA Administrator some discretion in determining what the final boundaries of the areas will be. Areas are identified as “nonattainment” when they violate or contribute to the violation of NAAQS. Areas are identified as “attainment/unclassified”⁴⁷ when they meet the standard or when the data are insufficient for determining compliance with the NAAQS.⁴⁸

The designation process is intended as a cooperative federal-state-tribal⁴⁹ process in which states and tribes provide initial designation recommendations to EPA for consideration. In Section 107(d)(1)(A) (42 U.S.C. 7407), the statute states that the governor of each state shall submit a list to EPA of all areas in the state, “designating as ... nonattainment, any area that does not meet (*or that contributes to ambient air quality in a nearby area that does not meet*) an air quality standard” (emphasis added).

Following state and tribal designation submissions, the EPA Administrator has discretion to make modifications, including to the area boundaries. As required by statute (Section 107(d)(1)(B)(ii)), the agency must notify the states and tribes regarding any modifications, allowing them sufficient opportunity to demonstrate why a proposed modification is inappropriate, but the final determination rests with EPA.

1997 PM_{2.5} NAAQS Designation Process

PM_{2.5} attainment or nonattainment designations were made primarily on the basis of three-year federally referenced PM_{2.5} monitoring data.⁵⁰ At the time the PM_{2.5} NAAQS were being finalized in 1997, EPA began developing methods for monitoring fine particles. Using funding specifically authorized for this purpose in FY1998-FY2000 EPA appropriations,⁵¹ the agency worked closely with states and tribes to initiate the deployment of a portion of the network of 1,200 monitors in January 1999. The majority of the monitors were not in place until January 2000. States and tribes

⁴⁶ The EPA reported that 127 areas (417 counties) were designated as nonattainment for at least one of the six criteria pollutants (including particulate matter) as of November 2009 (EPA’s Criteria Pollutant Summary Report; the data are periodically updated), available at <http://www.epa.gov/oar/oaqps/greenbk/anc13.html>.

⁴⁷ Section 107(d)(1)(A)(iii) of the CAA provides that any area that EPA cannot designate on the basis of available information as meeting or not meeting the standards should be designated unclassifiable.

⁴⁸ The EPA “Greenbook” lists areas of the country where air pollution levels persistently exceed the national ambient air quality standards and may be designated as nonattainment. Current information on the location of NAAQS nonattainment areas is available on EPA’s website at <http://www.epa.gov/oar/oaqps/greenbk/>.

⁴⁹ Though not required to do so, tribes have been encouraged to submit recommendations. The area designation requirements under the CAA (Section 107) are specific with respect to states, but not to tribes. The EPA follows the same designation process for tribes per Sections 110(o) and 301(d) of the CAA and pursuant to the 1988 Tribal Authority Rule, which specifies that tribes shall be treated as states in selected cases (40 CFR Part 49). For information regarding tribes that have participated in the PM_{2.5} designation recommendation process, see <http://www.epa.gov/pmdesignations>.

⁵⁰ A federally referenced monitor is one that has been accepted for use by EPA for comparison of the NAAQS by meeting the design specifications and certain precision and bias (performance) specifications (40 CFR Part 58).

⁵¹ Appropriations for monitoring averaged roughly \$50 million per year (P.L. 105-65, P.L. 105-226, P.L. 106-74).

were expected to rely on data collected during 2000-2002 for their recommendations. The EPA considered the 2001-2003 data to make the final PM_{2.5} designations published in January 2005.

In its guidance document,⁵² EPA identified several factors that would be considered in determining attainment with the 1997 PM_{2.5} NAAQS and specified data and conditions that would not be acceptable. The EPA's guidance also included a recommendation that states and tribes consider using the same boundaries for nonattainment for both the PM_{2.5} and eight-hour ozone standards, to facilitate consistency in future implementation plans. The EPA expected that many of the PM_{2.5} nonattainment areas would overlap with the eight-hour ozone designations.⁵³

However, PM_{2.5} designations do not include nonattainment classifications based on severity as specified by statute for PM₁₀ and ozone, which have two and seven classifications, respectively. PM_{2.5} is governed by the general nonattainment planning requirements of Title I (Part A and Part D, subpart 1) of the act.

The EPA recognized that determining the geographic extent of nearby source areas that contribute to nonattainment would be complicated. The CAA does not specifically require combining neighboring counties within the same nonattainment area, but it does require the use of metropolitan statistical area boundaries in the more severely polluted areas (Section 107(d)(4)(A)(iv)). Echoing this requirement, and similar to the eight-hour ozone approach, EPA recommended that Metropolitan Statistical Areas or Consolidated Metropolitan Statistical Areas⁵⁴ serve as the "presumptive boundary" for nonattainment areas under the 1997 PM_{2.5} standards.

Metropolitan areas are generally treated as units, even when part of the area lies in a separate state or does not have readings exceeding the standards. In the latter case, even though a specific county may not exceed the standards, the pollution generated there is likely to influence PM_{2.5} levels elsewhere in the metropolitan area. In addition, including the entire metropolitan area avoids the creation of additional incentives for sprawl development on the fringes of urban areas. For rural areas in violation of the 1997 PM_{2.5} standards, EPA's guidance presumed that the full county would be designated a nonattainment area.

The EPA has generally used its discretion to expand the size of nonattainment areas or to combine areas that a state listed as separate areas into a single larger unit. As it did in implementing other NAAQS, EPA also combined nonattainment counties across state lines into the same nonattainment area, if the counties are part of the same metropolitan area. Although, according to EPA, staff in the regions and the agency's Office of Air Quality Planning and Standards were available for assistance and consultation throughout the designation process pursuant to the statutory requirements for working with states, some states disagreed with EPA's final designations relative to the states' own recommendations.

⁵² Information regarding EPA's guidance for PM_{2.5} designation is available on EPA's PM_{2.5} website at http://www.epa.gov/ttn/naaqs/pm/pm25_index.html and its Policy and Guidance website at <http://www.epa.gov/ttn/oarpg>.

⁵³ A map showing the final designation areas for the PM_{2.5} and/or the eight-hour ozone NAAQS is available on EPA's website at <http://www.epa.gov/oar/oaqps/greenbk/mappm25o3.html>.

⁵⁴ As defined by the Office of Management Budget. For more information on metropolitan areas, see <http://www.census.gov/population/www/estimates/aboutmetro.html>.

1997 PM_{2.5} Area Designations Timeline

By the end of February 2004, 18 states and the District of Columbia had recommended 142 counties as potential nonattainment areas for the 1997 PM_{2.5} NAAQS.⁵⁵ After reviewing the state recommendations, EPA proposed modifications resulting in nonattainment designations for 244 counties⁵⁶ in 21 states and the District of Columbia at the end of June 2004. As required by statute, EPA notified each of the affected states regarding their specific modifications, providing them with the opportunity to submit new information and demonstrate why a proposed modification was inappropriate. Some states responding to EPA's proposal continued to support their original recommendations.

The EPA's final PM_{2.5} designation rule, published on January 5, 2005 (70 *Federal Register* 944-1019), established the boundaries for areas designated as "nonattainment," "unclassifiable" (data not sufficient to make a determination regarding compliance), or "attainment/unclassifiable."⁵⁷ The EPA designated 47 areas, composed of 225 counties in 20 states and the District of Columbia, as nonattainment; 5 areas consisting of 7 counties as unclassifiable;⁵⁸ and the remaining counties in the United States as attainment/unclassifiable.

The EPA's designations reflected minor modifications to its June 2004 proposal. Primarily, 19 counties were removed from the list of nonattainment areas, and other counties were redefined by designating only specified locations ("partial") within the county as nonattainment. In some cases, when considering factors defined in its guidance in conjunction with the additional information provided by the states and tribes, EPA determined that only those portions of a county that contained the significant sources of emissions should be considered as contributing to the violations. In other cases, the agency determined that if emissions from a large identifiable source in a county contribute to the violations in a nearby area, the portion of the county where the source is located would be designated nonattainment, even if it is not contiguous with the remainder of the designated area. The boundaries for these "noncontiguous" portions are based on legally recognized government boundaries, such as townships, tax districts, and census blocks.

Some states and stakeholders continued to contend that several counties should not be designated nonattainment, particularly when taking into account 2004 PM_{2.5} monitoring data. The EPA's final designations were based on monitoring data for the three-year period from 2001-2003. Monitoring data for 2004 were not available in time for EPA to meet its statutory deadline for PM_{2.5} geographical area designations (see timeline and discussion later in this report). The final PM_{2.5} designation rule, published on January 5, 2005, included provisions allowing states to submit no later than February 22, 2005, certified, quality-assured 2004 monitoring data that suggest a change in designation is appropriate for consideration (70 *Federal Register* 948). A

⁵⁵ For EPA's final and proposed PM_{2.5} geographical designation recommendations and those from individual states and tribes, see <http://www.epa.gov/pmdesignations>.

⁵⁶ Included seven cities: Baltimore, MD; St. Louis, MO; Alexandria, VA; Fairfax, VA; Falls Church, VA; Manassas, VA; and Manassas Park, VA.

⁵⁷ The EPA designates an area as attainment/unclassifiable if (1) monitored air quality data show that the area has not violated the standard during a three-year period or (2) there is not enough information to determine the air quality in the area. Despite the CAA, Section 107(d)(1)(A) definitions for "nonattainment," "attainment," and "unclassifiable," EPA does not apply the "attainment" nomenclature. It is generally the case that the agency has sufficient data to determine that an area is *not* in nonattainment, but the data are insufficient or incomplete to fully determine attainment.

⁵⁸ The EPA concluded that there was insufficient information to designate these areas as either nonattainment or attainment/unclassifiable. According to the January 2005 *Federal Register* Notice (70 *Federal Register* 65984), these areas had violating monitors for years 2000-2002 but incomplete data or other data issues for years 2001-2003.

nonattainment designation could be withdrawn if EPA agreed that the additional data warranted such a change.

On April 14, 2005, EPA published a final supplemental rule amending the agency's initial final designations published in January 2005 (70 *Federal Register* 19844). After reviewing 2002-2004 air quality monitoring data provided by several states, EPA determined that eight areas comprising 17 counties previously identified as not meeting the 1997 PM_{2.5} NAAQS should be designated as "in attainment" (see **Table 1** below). The EPA also changed four of the five areas designated as "unclassifiable" to "attainment," based on 2002-2004 data. The EPA did not consider the modifications for these areas "re-designations" because the changes were made prior to the April 5, 2005, effective date of the initial designations.

Table 1. Areas Previously Identified as Nonattainment for 1997 PM_{2.5} NAAQS Designated as Attaining the Standards, April 2005

State	Area Name	County
Alabama	Columbus, GA-AL	Russell
California	San Diego, CA	San Diego
Georgia	Athens, GA	Clarke
	Columbus, GA-AL	Muscogee
Indiana	Elkhart, IN	Elkhart
		St. Joseph
Kentucky	Lexington, KY	Fayette
		Mercer (partial)
Ohio	Toledo, OH	Lucas
	Youngstown-Warren, OH-PA	Wood
		Columbiana
Pennsylvania	Youngstown-Warren, OH-PA	Mahoning
West Virginia	Marion, WV	Trumbull
		Mercer
		Marion
		Monongalia (partial)
		Harrison (partial)

Source: U.S. Environmental Protection Agency, April 5, 2005. Available at <http://www.epa.gov/pmdesignations/1997standards/regs.htm>.

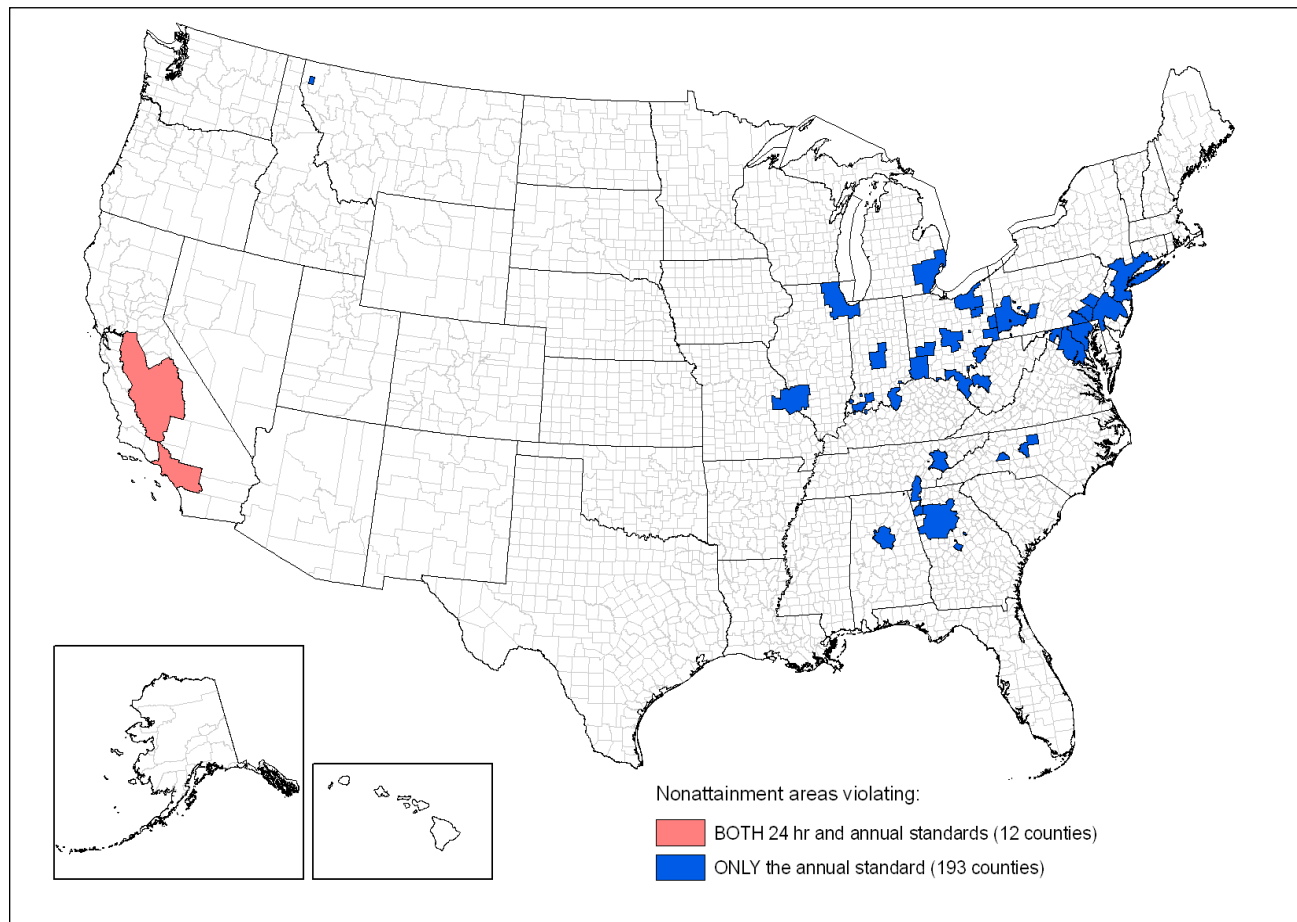
In letters dated January 20, 2006, EPA denied six petitions submitted to the agency requesting reconsideration of the previous designations of one or more full or partial counties as nonattainment for the 1997 PM_{2.5} NAAQS. The petitions were for counties in Georgia, Illinois, Michigan, Missouri, Ohio, and West Virginia.⁵⁹ In the August 25, 2008, *Federal Register*, EPA announced its determination that a three-county (Harrisburg, Lebanon, Carlisle) Pennsylvania nonattainment area for the 1997 PM_{2.5} NAAQS was in attainment.⁶⁰ The determination was based on certified ambient air monitoring data showing that the area has monitored attainment of the 1997 PM_{2.5} NAAQS since the 2004-2006 monitoring period. By the end of August 2008, final nonattainment designations were in effect for 39 areas, comprising 205 counties within 20 states

⁵⁹ For more information, see <http://www.epa.gov/pmdesignations/1997standards/regs.htm>.

⁶⁰ 73 *Federal Register* 49949, August 25, 2008.

(and the District of Columbia) nationwide, with a combined population of almost 90 million. The EPA map in **Figure 1** highlights the nonattainment designation areas for the 1997 PM_{2.5} NAAQS.

Figure 1. EPA's Final Designations of Nonattainment Areas for the 1997 PM_{2.5} National Ambient Air Quality Standards (NAAQS) (as of August 2008)



Source: Created by the Congressional Research Service with data provided by the Environmental Protection Agency.

The final designated nonattainment areas for the 1997 PM_{2.5} NAAQS were primarily concentrated in the central, mid-Atlantic, and southeastern states east of the Mississippi River, as well as in California.⁶¹ More than 2,900 counties in 30 states have been designated attainment/unclassifiable for the 1997 PM_{2.5} NAAQS. Some public interest groups maintain that at least 150 additional counties warranted nonattainment designations on the basis of emission sources in those areas.⁶² Any area initially designated attainment/unclassifiable may be subsequently re-designated to nonattainment if ambient air quality data in future years indicate that such a re-designation is appropriate. Likewise, as was the case for EPA's determination regarding the three-county area in Pennsylvania, areas initially designated nonattainment may be

⁶¹ California has established its own PM_{2.5} standards; for more information, see CRS Report RL31531, *Particulate Matter Air Quality Standards: Background*, by Robert Esworthy; or see the California Air Resources Board website at <http://www.arb.ca.gov/pm/pmmeasures/pmmeasures.htm>.

⁶² American Lung Association, "No One Should Have to Breathe Unsafe Air," December 17, 2004; press release available at <http://www.lungusa.org/site/c.dvLUK9O0E/b.4061173/apps/s/content.asp?ct=323661>.

determined to be attainment areas if more current certified monitoring data support the designation.

Demonstrating Attainment with the 1997 PM_{2.5} NAAQS

As noted earlier in this report, several areas previously designated nonattainment for the 1997 PM_{2.5} NAAQS currently have air quality that attains the level set by the standards based on certified ambient air monitoring data for the period 2006-2008. EPA identifies these areas through clean data/attainment determinations published in the *Federal Register*. Pursuant to 40 CFR 51.1004, this action by EPA suspends requirements for these areas to submit attainment demonstrations, associated reasonably available control measures, reasonable further progress plans, contingency measures, and other planning SIPs related to attainment of the 1997 PM_{2.5} NAAQS as long as the areas continue to meet the standard. EPA has indicated that as of June 2010, 19 of the 39 areas (includes multiple states and counties) originally designated nonattainment for the 1997 PM_{2.5} NAAQS were in attainment with the standard based on a preliminary assessment of air quality monitoring data for the three-year period 2006 to 2008.⁶³

According to the February 2010 EPA report entitled *Our Nation's Air: Status and Trends Through 2008*,⁶⁴ nationally, annual and 24-hour PM_{2.5} concentrations were 17% and 19% percent lower, respectively, in 2008 compared to 2001. Based on a comparison of results from PM_{2.5} monitoring locations (565 sites) for two three-year periods, 2001-2003 and 2006-2008, EPA reported that almost all measured sites showed a decline or little change in measured PM_{2.5} concentrations.

Of the 565 monitoring sites, EPA reported that 16 sites in California, Illinois, Indiana, Michigan, Ohio, Utah, and West Virginia showed the greatest decreases in annual PM_{2.5} concentrations, and five sites in California, Montana, Oregon, Pennsylvania, and Utah showed the greatest decrease in 24-hour PM_{2.5} concentrations. Four monitoring sites located in Montana, Arizona, and Wisconsin showed annual PM_{2.5} concentrations at levels greater than 1 µg/m³ in, but none were above the annual PM_{2.5} NAAQS standard for the most recent three-year period (2006-2008). Nineteen sites located throughout all regions of the United States showed an increase in 24-hour PM_{2.5} concentrations greater than 3 µg/m.³ Seven of these sites, located in or near metropolitan areas in Arizona, California, Georgia, Montana, Virginia, and Washington, were above the 2006 24-hour PM_{2.5} NAAQS standard for the most recent three year period.

For both the 24-hour and annual PM_{2.5} standards, most of the areas that showed the greatest improvement in concentration levels when comparing the two three-year periods were the ones that generally had the highest in earlier years. Despite the reported overall progress, in 2008 nearly 37 million people lived in counties with measured concentrations exceeding both the annual and the 24-hour (based on EPA's 2006 revised standards) PM_{2.5} national air quality standards, according to the February 2010 EPA report.⁶⁵

⁶³ See footnote 15.

⁶⁴ EPA-454/R-09-002, February 2010 <http://www.epa.gov/airtrends/2010/index.html>.

⁶⁵ See footnote 64, pg. 1. Refers to trends in the measured PM_{2.5} concentrations relative to their air quality standards in those areas where monitors are located across the country, and does reflect all designated nonattainment areas. Comparatively, the combined population residing in EPA's final nonattainment designation areas for the 1997 PM_{2.5} NAAQS, consisting of 208 counties in 20 states and the District of Columbia, is almost 90 million.

The State Implementation Plan (SIP)

Following the designation of an area as nonattainment, the state where the area is located must develop a State Implementation Plan (SIP) that demonstrates how attainment with the PM_{2.5} standards will be achieved.⁶⁶ Under Section 110 of the CAA, states must submit their SIPs to EPA within three years of designation; 1997 PM_{2.5} NAAQS SIPs were due April 5, 2008. To be approved, a SIP must demonstrate that the area will reach attainment of the standards by a specified deadline—April 2010 for 1997 PM_{2.5} NAAQS unless an extension allowed under the CAA is granted.⁶⁷

SIPs include pollution control measures that are to be implemented by federal, state, and local governments, and rely on models of the impact on air quality of projected emission reductions to demonstrate attainment. On November 27, 2009, EPA published its findings that three states failed to meet the deadline for submitting complete SIPs (74 *Federal Register* 62251-62255). For the remaining designated areas, states either submitted a complete SIP or EPA made a final approval that the area attained the 1997 PM_{2.5} NAAQS based on 2006-2008 air quality data. States with areas that have received final clean data determinations, including those that did not adequately satisfy the SIPs requirement, are not subject to the final action in the November 27, 2009, notice.

In the November 27, 2009, notice, EPA issued findings that Georgia, Illinois, and Pennsylvania missed deadlines for submitting plans, or elements of plans for four nonattainment areas: Atlanta, Georgia; St. Louis, (Illinois portion only); Liberty-Clairton, Pennsylvania; and Philadelphia-Wilmington, (Pennsylvania portion only).⁶⁸ If acceptable plans have not been submitted within 18 months of the effective date (publication) of the November 2009 Notice (May 2011), states will begin to face sanctions.

As detailed in the November 27, 2009, Notice, Section 179(a)(1) of the CAA establishes specific consequences if EPA finds that a state has failed to submit a SIP or, with regard to a submitted SIP, if EPA determines it is incomplete or if EPA disapproves it. Specifically:

Pursuant to CAA section 179(a) and (b) and 40 CFR 52.31, the offset sanction identified in CAA section 179(b)(2) will apply in the area subject to the finding. [Any new or modified emission sources will require obtaining offset emissions]. If EPA has not affirmatively determined that the State has made a complete submission within 6 months after the emission offset sanction is imposed, then the highway funding sanction will also apply in areas designated nonattainment, in accordance with CAA section 179(b)(1) and 40 CFR 52.31. Additionally, any of these findings also triggers an obligation for EPA to promulgate a FIP [Federal Implementation Plan] if the state has not submitted, and EPA has not approved, the required SIP within 2 years of the finding.⁶⁹

⁶⁶ Within three years of issuance of a NAAQS, states are also required to submit “infrastructure” plans demonstrating that they have the basic air quality management components necessary to implement the NAAQS. For a general overview of the NAAQS implementation plans process see EPA’s “State Implementation Plan Overview” website at <http://www.epa.gov/air/urbanair/sipstatus/overview.html>.

⁶⁷ Under section 172(a)(2)(A) of the CAA, EPA may grant an area an extension of the initial attainment date for one to five years (in no case later than 10 years after the designation date for the area). A state requesting an extension must submit an implementation plan (SIP) by the required deadline that includes, among other things, sufficient information demonstrating that attainment by the initial attainment date is “impracticable.”

⁶⁸ See footnote 14.

⁶⁹ 74 *Federal Register* 62253, November 27, 2009.

The “18-month clock” will stop and subsequent sanctions will not take effect if EPA finds the state has made a complete submission within 18 months of the November 2009 Notice. States with nonattainment areas were to be in compliance with the 1997 PM_{2.5} NAAQS by April 2010, unless they were granted an extension.

EPA’s Implementation Rule for the 1997 PM_{2.5} NAAQS

On April 25, 2007, EPA published its final rule⁷⁰ that described the requirements that states and tribes must meet in their implementation plans to achieve and maintain attainment of the 1997 PM_{2.5} NAAQS.⁷¹ In addition to detailing provisions necessary to demonstrate how the PM_{2.5} NAAQS will be attained, the implementation rule included guidance for submitting a SIP demonstrating that reaching attainment within the five-year requirement is impractical. A number of provisions that generated several comments during the proposal were retained in the final rule,⁷² and continue to be the topic of debate. As noted earlier, petitions for legal review of EPA’s implementation rule were filed with the U.S. Court of Appeals for the D.C. Circuit, and two petitions for reconsideration were filed with EPA.

Transportation Conformity

If new or revised SIPs for PM_{2.5} attainment establish or revise a transportation-related emissions budget, or add or delete transportation control measures (TCMs), they trigger “conformity” determinations. Transportation conformity is required by the CAA, Section 176(c) (42 U.S.C. 7506(c)), to prohibit federal funding and approval for highway and transit projects unless they are consistent with (“conform to”) the air quality goals established by a SIP and will not cause new air quality violations, worsen existing violations, or delay timely attainment of the national ambient air quality standards. Conformity becomes applicable within one year of the effective date of designating an area as nonattainment. EPA has promulgated several transportation conformity rules and rule amendments since its enactment as part of the 1990 CAA.⁷³ The rules generally establish the criteria and procedures for determining whether transportation plans, transportation improvement programs (TIPs), or projects conform to a state’s SIP.

On July 1, 2004, EPA published a final rule⁷⁴ making transportation conformity regulations applicable explicitly to PM_{2.5} nonattainment areas and included criteria and procedures for the

⁷⁰ 72 *Federal Register* 20586-20667, April 25, 2007.

⁷¹ The rule addresses attainment demonstration and modeling; local emission reduction measures, including reasonably available control technology (RACT), reasonably available control measures (RACM), and reasonable further progress (RFP); regional emission reduction strategies; innovative program guidance; emission inventory requirements; transportation conformity; and stationary source test methods.

⁷² Each section of the final April 25, 2007, PM_{2.5} implementation rule (72 *Federal Register* 20586-20667) summarizes policies and options discussed in the proposed rule, and provides responses to the major comments received on each issue. Comments and other supporting materials are available the docket established for this rule (ID-HQ-OAR-2003-0062) electronically at <http://www.regulations.gov> or in hard copy at the EPA Docket Center.

⁷³ The initial conformity rule was promulgated by EPA on November 24, 1993 (58 *Federal Register* 62188), and has subsequently been amended several times; see EPA’s “Chronological List of Transportation Conformity Rulemakings” at <http://www.epa.gov/otaq/stateresources/transconf/conf-regs-c.htm>, and “Transportation Conformity Regulations Current as of January 2008,” EPA420-B-08-001, January 2008, <http://www.epa.gov/otaq/stateresources/transconf/regs/420b08001.pdf>.

⁷⁴ 69 *Federal Register* 40004, July 1, 2004. See also Companion Guidance for the July 1, 2004, Final Transportation Conformity Rule: Conformity Implementation in Multi-Jurisdictional Nonattainment and Maintenance Areas for Existing and New Air Quality Standards, EPA, July 2004, EPA420-B-04-012, Transportation and Regional Programs Division, Office of Transportation and Air Quality, available at <http://www.epa.gov/otaq/stateresources/transconf/>

new PM_{2.5} and eight-hour ozone NAAQS. On May 6, 2005, EPA published a final rule⁷⁵ further amending the transportation conformity regulations by adding transportation-related PM_{2.5} “precursors” and specifying when these precursors must be considered in conformity determinations before and after PM_{2.5} SIPs are submitted.⁷⁶ The EPA established the criteria for determining which transportation projects must be analyzed for local particle emissions (referred to as “hot spots”⁷⁷) in PM_{2.5} nonattainment and maintenance areas, and revised existing requirements for projects in PM₁₀ areas, in a final rule published on March 10, 2006.⁷⁸ Although petitioners challenged certain provisions of the July 2004 and March 2006 final rules with varying results,⁷⁹ all PM_{2.5} nonattainment areas have completed their initial transportation conformity determinations, and as a result their transportation plans and programs conformed to the 1997 PM_{2.5} NAAQS according to EPA.⁸⁰

On March 24, 2010, EPA published a final rule amending the transportation conformity regulation primarily to incorporate the October 17, 2006, strengthening of the 24-hour PM_{2.5} air quality standard and revocation of the annual PM₁₀ standard.⁸¹ The final rule, which affects implementation of conformity in PM_{2.5} and PM₁₀ nonattainment and maintenance areas, also addresses a court remand concerning hot-spot analyses as they apply to PM_{2.5} and PM₁₀, as well as to carbon monoxide and nonattainment and maintenance areas.

Upwind Pollutant Contributions: § 126 of the CAA

Whether any special consideration can be given to areas whose air quality is adversely affected by pollution from upwind areas is one of the more frequently raised issues in nonattainment areas. Unlike the larger coarse particles, which generally settle more rapidly and fall near their source of emission, the smaller PM_{2.5} particles frequently remain in the atmosphere longer and can travel significant distances from their original source. The transport of PM_{2.5} can contribute to, and in some cases can be the primary cause of, nonattainment in areas downwind of an emission source.

Subpart 1 of the CAA allows EPA to “classify the area for the purpose of applying an attainment date” and to consider such factors as “the availability and feasibility of pollution control measures.” As referenced in the proposed PM_{2.5} implementation rule, areas also may petition the agency under § 126 of the CAA to impose controls on upwind sources that significantly

policy.htm.

⁷⁵ 70 *Federal Register* 24280, May 6, 2005.

⁷⁶ Precursors are pollutants that react chemically in the atmosphere to form other pollutants. The transportation-related PM_{2.5} precursors identified in the May 2005 rule are nitrogen oxides (NO_x), volatile organic compounds (VOCs), sulfur oxides (SO₂), and ammonia (NH₃). See <http://www.epa.gov/otaq/stateresources/index.htm>.

⁷⁷ The CAA defines “hot-spot analysis” as an estimation of likely future localized pollutant concentrations resulting from a new transportation project and a comparison of those concentrations to the relevant air quality standard (40 CFR 93.101).

⁷⁸ 71 *Federal Register* 12468, March 10, 2006.

⁷⁹ For findings by the U.S. Court of Appeals for the D.C. Circuit, see *Environmental Defense v. EPA*, No. 04-1291 (D.C. Cir. October 20, 2006), and *Natural Resources Defense Council, Environmental Defense, and Sierra Club v. EPA*, No. 06-1164 (D.C. Cir. December 2006).

⁸⁰ Information provided to CRS by EPA’s Office of Air Quality and Planning, April 17, 2008.

⁸¹ 75 *Federal Register* 14260, March 24, 2010. Prior to the final rule EPA provided interim guidance for meeting conformity requirements: *Interim Transportation Conformity Guidance for 2006 PM_{2.5} NAAQS Nonattainment Areas* (EPA-420-B-09-036, November 2009) (<http://www.epa.gov/otaq/stateresources/transconf/policy/420b09036.pdf>). See also EPA’s “Transportation Conformity: Regulations” website at <http://www.epa.gov/otaq/stateresources/transconf/conf-reg.htm>, which provides access to all transportation conformity regulations and policy guidance.

contribute to their nonattainment of the standard. The May 2005 promulgation of the Clean Air Interstate Rule (CAIR)⁸² was expected to address the interstate transport of pollutants (SO₂ and NO_x) from electric generating units (EGUs) hindering downwind states from attaining the eight-hour ozone and 1997 PM_{2.5} NAAQS.⁸³ Although modifying its decision in December 2008, the D.C. Circuit Court's July 2008 decision⁸⁴ to vacate CAIR put the focus back on § 126 petitions as the available means to address interstate transport of air pollutants in the immediate future⁸⁵ (a more detailed discussion of the Court's decision is provided later in this report under "D.C. Circuit's Decision Vacating the Clean Air Interstate Rule (CAIR)").

EPA has never granted a § 126 petition in the manner outlined by the statute.⁸⁶ EPA denied a 2004 § 126 petition from the state of North Carolina for several reasons, in part arguing that CAIR was a better mechanism for addressing the interstate transport of pollution to which North Carolina was subject than was the state's petition under § 126. North Carolina challenged this denial in court.⁸⁷ Its challenge was stayed, pending the outcome of the CAIR lawsuit, of which North Carolina was a petitioner. With the CAIR case decided, EPA asked the D.C. Circuit to remand the North Carolina petition to the agency for reconsideration, which the court agreed to do on March 5, 2009.⁸⁸ In December 2008, Delaware petitioned EPA under § 126 to impose emission controls on electric generating units in nine other states.⁸⁹ New Jersey filed a § 126 petition with the agency on May 13, 2010, to address emissions from a Pennsylvania coal-fired power plant.⁹⁰ Section 126(b) requires EPA to make the finding in the petition or deny it within 60 days. However, section 307(d) of the CAA provides extensions under certain circumstances for rulemaking. EPA has submitted such extensions for both the Delaware⁹¹ and New Jersey⁹² petition.

EPA's proposed "Transport Rule" published August 2, 2010, is intended to supersede the current CAIR, and, in conjunction with other federal and state action, reduce the impact of transported emissions on downwind states.⁹³ The proposal would include required reductions in SO₂ and NO_x emissions in the following 24 jurisdictions that contribute significantly to nonattainment in, or

⁸² Environmental Protection Agency, Rule to Reduce Interstate Transport of Fine Particulate Matter and Ozone (Clean Air Interstate Rule); Revisions to Acid Rain Program; Revisions to the NO_x SIP Call; Final Rule (70 *Federal Register* 25162-25405, May 12, 2005), p. 25246.

⁸³ See footnote 24.

⁸⁴ 531 F.3d 896 (D.C. Cir. 2008).

⁸⁵ For a more detailed discussion of the court's decision and its implications, see CRS Report RL34589, *Clean Air After the CAIR Decision: Multi-Pollutant Approaches to Controlling Powerplant Emissions*, by James E. McCarthy, Larry Parker, and Robert Meltz.

⁸⁶ Petitions regarding NAAQS other than PM_{2.5} have been filed with the agency; the most well-known are those that were filed in August 1997 by eight northeastern states, four of which were granted by the agency in January 2000. See CRS Report 98-236, *Air Quality: EPA's Ozone Transport Rule, OTAG, and Section 126 Petitions—A Hazy Situation?*, by Larry Parker and John Blodgett (available from the authors to congressional clients upon request).

⁸⁷ *Sierra Club v. EPA*, No. 06-1221 (D.C. Cir. filed June 23, 2006).

⁸⁸ *Sierra Club v. EPA*, No. 06-1221 (D.C. Cir., March 5, 2009).

⁸⁹ The nine states are Maryland, Michigan, New Jersey, New York, North Carolina, Ohio, Pennsylvania, Virginia, and West Virginia. Delaware Department of Natural Resources and Environmental Control, <http://www.awm.delaware.gov/AQM/Documents/Petition%20126%2012-10-08.pdf>.

⁹⁰ New Jersey Department of Environmental Protection, <http://www.state.nj.us/dep/baqp/petition/126petition.htm>.

⁹¹ 74 *Federal Register* 7820-7823, February 20, 2009.

⁹² 75 *Federal Register* 39633-39635 July 12, 2010.

⁹³ 75 *Federal Register* 45210-45565, August 2, 2010. See also U.S. EPA's "Air Transport" website at <http://www.epa.gov/airtransport/actions.html>.

interfere with maintenance by, a downwind area with respect to the annual PM_{2.5} NAAQS promulgated in July 1997: Alabama, Delaware, District of Columbia, Florida, Georgia, Illinois, Indiana, Iowa, Kentucky, Louisiana, Maryland, Michigan, Minnesota, Missouri, New Jersey, New York, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, Virginia, West Virginia, and Wisconsin.

Grant Programs

Although EPA does not have a grant program specifically designed to assist nonattainment areas, the agency generally provides grants to state air pollution agencies in support of their programs. Other sources of funding are also available. For example, states may obtain funding for projects intended to contribute to the attainment or maintenance of NAAQS under the Department of Transportation's (DOT's) Congestion Mitigation and Air Quality Improvement Program (CMAQ). Congress authorized \$8.6 billion for this program for FY2005-FY2009 under the Safe, Accountable, Flexible and Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) (P.L. 109-59), signed into law on August 10, 2005.

Authorized initially by Congress under the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA, P.L. 102-240) and funded by the Highway Trust Fund, CMAQ provides funding for surface transportation and other related projects that contribute to air quality improvements and congestion mitigation. In particular, the program is authorized to fund projects that contribute to the reduction of carbon monoxide (CO) and ozone concentrations. CMAQ funds are apportioned to a state based on its population and pollution reduction needs.⁹⁴ States with no maintenance or nonattainment areas for ozone or CO are guaranteed a minimum of 0.5% of each fiscal year's authorized CMAQ funds.

CMAQ was expanded to allow the use of funds for projects intended to reduce particulate concentrations under the Transportation Equity Act for the 21st Century (TEA-21, P.L. 105-178). TEA-21 did not, however, change the apportionment formula that is based on CO and ozone. States with maintenance or nonattainment areas for *only* particulates receive the guaranteed minimum.⁹⁵

Recent Actions and Their Implications for Achieving Attainment of the 1997 PM_{2.5} NAAQS

A number of events, most notably the D.C. Circuit Court's July 2008 decision that would have vacated the EPA 2005 Clean Air Interstate Rule (CAIR) in its entirety, have directly affected the timely implementation of the 1997 PM_{2.5} NAAQS. Although, on December 24, 2008, the D.C. Circuit subsequently modified its original decision by temporarily reinstating the rule until EPA develops an alternative, the court's actions have raised a number of questions regarding implementation of the PM NAAQS. Also impacting implementation of the 1997 PM_{2.5} NAAQS

⁹⁴ For the FY2008 apportionment of CMAQ funds, see the U.S. Department of Transportation Federal Highway Administration Notice: Revised Apportionment of Fiscal Year (FY) 2008 Congestion Mitigation & Air Quality Improvement Program Funds, January 30, 2008, <http://www.fhwa.dot.gov/legisregs/directives/notices/n4510675.htm>; for prior years, see <http://www.fhwa.dot.gov/legisregs/directives/notices.htm>.

⁹⁵ For a more detailed discussion of CMAQ and relevant legislation, see CRS Report RL33119, *Safe, Accountable, Flexible, Efficient Transportation Equity Act - A Legacy for Users (SAFETEA-LU or SAFETEA): Selected Major Provisions*, by John W. Fischer, and CRS Report RL33057, *Surface Transportation Reauthorization: Environmental Issues and Legislative Provisions in SAFETEA-LU (H.R. 3)*, by Linda Luther.

are EPA's final 2006 revisions of the PM NAAQS and subsequent final designation of nonattainment areas in November 2009, and actions regarding implementation of the agency's eight-hour ozone NAAQS. Finally, EPA has initiated the next round of periodic review of the PM NAAQS and announced its intent to expedite that review, targeting February 2011⁹⁶ for proposing any changes to the standards. All of these issues have garnered attention in Congress.

D.C. Circuit's Decision Vacating the Clean Air Interstate Rule (CAIR)⁹⁷

The EPA's Rule to Reduce Interstate Transport of Fine Particulate Matter and Ozone, or the Clean Air Interstate Rule (CAIR), published in May 2005, was identified as an important tool for helping states address the interstate transport of pollutants (SO₂ and NO_x) from electric generating units (EGUs) hindering downwind states from attaining the eight-hour ozone and 1997 PM_{2.5} NAAQS.⁹⁸ Under the EPA's approach to the SIPs, implementation of CAIR would have met the interstate transport (downwind state) provision of Section 110(a)(2)(D) of the CAA.

On July 11, 2008, the U.S. Court of Appeals for the D.C. Circuit issued a decision vacating CAIR.⁹⁹ However, on December 23, 2008, the court reversed itself by allowing CAIR to remain in effect until a new rule is promulgated by EPA, noting that vacating the old rule would "temporarily defeat ... the enhanced protection of the environmental values" that the rule was designed to preserve.¹⁰⁰ The court did not impose a specific deadline on EPA's development of the replacement rule, but it did say that it was not granting an indefinite stay of its July 2008 decision. As already discussed, on August 2, 2010, EPA published a proposed "Transport Rule" intended to supersede the current CAIR.

Although CAIR generally had broad support among environmentalists and many in the regulated community, no less than 32 petitions¹⁰¹ for review of CAIR were consolidated and decided in *North Carolina v. EPA*. Some, including the state of North Carolina,¹⁰² argued that the rule was not strong enough to address pollution from upwind sources. Others, mostly individual utilities, contended that the rule's emission budgets would disproportionately affect certain operations and facilities. The D.C. Circuit found several of the key challenges valid, but decided against voiding only the successfully challenged portions. Noting that EPA regards CAIR as one integrated action, the court's July 11, 2008, decision would have vacated the entire rule (and its associated Federal Implementation Plan) and remanded it to EPA.

⁹⁶ See footnote 43.

⁹⁷ For a more detailed discussion of the court's decision and its implications, see CRS Report RL34589, *Clean Air After the CAIR Decision: Multi-Pollutant Approaches to Controlling Powerplant Emissions*, by James E. McCarthy, Larry Parker, and Robert Meltz.

⁹⁸ See footnote 24.

⁹⁹ 531 F.3d 896 (D.C. Cir. 2008).

¹⁰⁰ 550 F.3d 1176 (D.C. Cir. 2008).

¹⁰¹ EPA's CAIR "Regulatory Actions" website, at <http://www.epa.gov/cair/rule.html>, presents overviews of these challenges and the agency's responses chronologically. The complete petitions are available in the docket for the CAIR, Docket ID No. EPA-HQ- OAR-2003-0053, at <http://www.regulations.gov>.

¹⁰² Prior to the publication of the final CAIR rule, North Carolina filed a petition in March 2004 under Section 126 of the federal CAA, which allows states to seek federal intervention on transboundary air pollution. The petition, settlement (*North Carolina v. Johnson*, No. 5:05-CV-112-BR(3), February 17, 2005, E.D.N.C.), and subsequent actions regarding this petition can also be found in the CAIR Docket.

In developing CAIR, with respect to the 1997 PM_{2.5} NAAQS, EPA modeled the emissions impacts of 37 eastern states on 62 eastern downwind counties projected by EPA to be in nonattainment in 2010.¹⁰³ EPA found 23 states and the District of Columbia were projected to contribute significantly to 2010 PM_{2.5} nonattainment. These states and the District constitute the region covered under CAIR's annual NO_x and SO₂ caps.

Based on air quality analyses in support of the CAIR, EPA predicted that 17 of 36 areas in the eastern United States designated as nonattainment (out of compliance) with the 1997 PM_{2.5} NAAQS would reach attainment by 2010 as a result of implementing CAIR in conjunction with other existing national programs.¹⁰⁴ On the other hand, the EPA analyses recognized that as many as 19 of the areas would remain in nonattainment, highlighting the importance of local and state emission reduction efforts. The extent of pollution reduction projected to result from implementing CAIR had been the subject of considerable debate among stakeholders and some Members of Congress for some time prior to the July 2008 D.C. Circuit decision to vacate the rule in its entirety, and its subsequent decision to temporarily stay its decision.¹⁰⁵

Under EPA's implementation guidance for the SIPs outlining states' strategies for complying with the 1997 PM_{2.5} NAAQS, carrying out the CAIR would have met the interstate transport (downwind state) provision of § 110(a)(2)(D) of the CAA. As litigation regarding certain aspects of CAIR was pending, EPA reported that its implementation was continuing.¹⁰⁶ According to EPA, all the states covered under CAIR chose to participate in the trading programs for SO₂ and NO_x (or acknowledged an EPA Federal Implementation Plan (FIP) as a default); some also have established direct control programs complementing the trading programs. States had been working to put implementing rules in place, and some in the regulated community had been going forward with investing in equipment for CAIR.

The D.C. Circuit's original July 2008 decision vacating CAIR in its entirety presented a major setback to the implementation of the 1997 PM_{2.5} (and ozone) NAAQS. EPA's Director of Atmospheric Programs testified before Congress that

... [i]n many cases, states in the CAIR region have relied heavily on the emission reductions required by CAIR as they conducted their modeling to show that they will meet the 1997 ambient air quality standards on time. These attainment demonstration components of the SIPs will likely need to be revised to show how the states will achieve the emission reductions previously required by CAIR.¹⁰⁷

Current and pending SIPs from downwind states would have potentially been inadequate because they assumed the CAIR reductions in interstate transport of pollutants. SIPs from upwind states, on the other hand, could be inadequate if they do not prevent downwind nonattainment: the CAA makes clear that states are to impose controls on stationary sources of pollution that contribute significantly to downwind nonattainment or interfere with the maintenance of air quality standards in other states (§ 110(a)(2)(D)). This provision of the statute has been widely

¹⁰³ Clean Air Interstate Rule, p. 25247.

¹⁰⁴ See page 66006 of 70 *Federal Register* 65984, November 1, 2005, Proposed Rule to Implement the Fine Particle National Ambient Air Quality Standards.

¹⁰⁵ For more information on the CAIR, see CRS Report RL32927, *Clean Air Interstate Rule: Review and Analysis*, by Larry Parker, and CRS Report RL32273, *Air Quality: EPA's Proposed Interstate Air Quality Rule*, by Larry Parker and John Blodgett.

¹⁰⁶ *Acid Rain and Related Programs: 2006 PROGRESS REPORT*, EPA-430-R-07-011, November 2007, <http://www.epa.gov/airmarkets/progress/docs/2006-ARP-Report.pdf>.

¹⁰⁷ Testimony of Mr. Brian McLean, Director of Atmospheric Programs, Office of Air and Radiation, U.S. EPA, before the Senate Committee on Environment and Public Works, Subcommittee on Clean Air and Nuclear Safety, July 29, 2008, <http://epw.senate.gov/public/>.

disregarded in the past, with little EPA effort (other than regional cap-and-trade programs) to address it. This reluctance to act can be challenged through CAA § 126 petitions, and the court's decision puts the focus on these petitions as the available means of addressing interstate transport of air pollutants in the immediate future. As discussed, EPA has never granted a § 126 petition in the manner outlined by the statute (see earlier discussion in this report under "Upwind Pollutant Contributions: § 126 of the CAA").

On September 24, 2008, EPA requested reconsideration of the court's July 2008 decision vacating CAIR, with suggestion for rehearing en banc (that is, a rehearing by the entire court), as did the Natural Resources Defense Council (NRDC), the National Mining Association, and the Utility Air Regulatory Group, in separate petitions. Granting reconsideration or a rehearing en banc is unusual, and success is especially unlikely given that the initial *North Carolina v. EPA* decision was unanimous and appeared to give the court little pause. Granting a rehearing requires the vote of a majority of the active duty judges on the D.C. Circuit. As requested by the court, a new round of legal briefings was filed in early November 2008. In a brief submitted on behalf of EPA November 17, 2008, the U.S. Department of Justice continued to support the request in the petition for a rehearing, but said that a stay of the decision long enough to allow implementation of a replacement regulatory regime would be preferable to complete vacatur.

On December 23, 2008, the D.C. Circuit, on EPA's motion, reversed its decision to vacate CAIR, allowing for EPA to develop a replacement rule.¹⁰⁸ The Circuit, however, left the substantive requirements and findings of its July 2008 decision fully intact. The court's decision stated that there is no simple "fix" that would make CAIR acceptable to the court. It is also unclear whether the agency can salvage the regional cap-and-trade approach, which lies at the heart of CAIR, or if cap-and-trade on a smaller scale, whether intrastate or intra-company, would face better odds.¹⁰⁹ In its July 2008 decision, the court found "more than several fatal flaws" in the rule, and concluded, "No amount of tinkering will transform CAIR, as written, into an acceptable rule."¹¹⁰ The D.C. Circuit did not impose a specific deadline on EPA's development of the replacement rule in its December 2008 decision. However, the court did emphasize that it was not granting an indefinite stay of its July 2008 decision. Rewriting the regulations to address the court's objections posed significant difficulties for EPA.

The deadlines for states in nonattainment to submit SIPs and reach attainment (with the exception of exemptions) of the 1997 PM_{2.5} NAAQS have passed. While it is apparent that states were able to rely, to some extent, on reductions associated with the first phase of CAIR through 2010, continued reliance on CAIR for subsequent reductions is an area of some debate. According to EPA, current CAIR requirements for reductions remain in effect, and CAIR regional control programs continue their operations pending the agency's promulgation of an alternative transport rule.¹¹¹ EPA anticipates finalizing the proposed "Transport Rule" published August 2, 2010,¹¹² by late spring 2011.

¹⁰⁸ 550 F.3d 1176 (D.C. Cir. 2008).

¹⁰⁹ Allowing even modest emissions trading can significantly reduce costs. Estimates made during the development of the acid rain trading program indicated that intra-utility trading reduced costs by half over a plant-by-plant control program, while including intrastate trading reduced costs by an additional 10%. Further expansion to interstate trading reduced costs an additional 10%. See Larry B. Parker, Robert D. Poling, and John L. Moore, "Clean Air Act Allowance Trading," 21 *Environmental Law*, 2021, 2022-2068 (1991).

¹¹⁰ 531 F.3d at 930 (D.C. Cir. 2008).

¹¹¹ EPA proposed Transport Rule fact sheet, p. 5, available at <http://www.epa.gov/airtransport/actions.html>.

¹¹² 75 *Federal Register* 45210-45565, August 2, 2010. See also U.S. EPA "Air Transport" website at <http://www.epa.gov/airtransport/actions.html#jul10>. EPA announced the release of the proposal on July 6, 2010.

Completion of EPA's Review of the Particulates NAAQS and the October 2006 Changes¹¹³

At the end of 2005, EPA completed its statutorily required¹¹⁴ review and assessment of relevant scientific studies to either reaffirm or modify the particulates NAAQS. Based on the review, on October 17, 2006, EPA promulgated revisions to the particulates NAAQS.¹¹⁵ Given the simultaneity of the 2006 particulates NAAQS as revised and the ongoing implementation of the 1997 PM_{2.5} standards, outcomes and challenges associated with the review and EPA's changes to the existing (1987 and 1997) NAAQS for PM₁₀ and PM_{2.5} could affect the implementation schedule for the 1997 PM_{2.5} NAAQS.

Based on its review and analysis of scientific studies available between 1997 and 2002,¹¹⁶ and determinations made by the Administrator, EPA's modifications to the particulates NAAQS tightened the current NAAQS primarily by strengthening the daily (24-hour) standard for PM_{2.5}. The 2006 NAAQS lowered the daily PM_{2.5} standard from 65 micrograms per cubic meter (µg/m³) to 35 µg/m³ and retained the annual standard at 15 µg/m³. The EPA left the existing (1987) daily standard for coarse particles (PM₁₀) in place at 150 µg/m³ and relaxed the standard somewhat by revoking the existing annual maximum concentration standard of 50 µg/m³.

As anticipated, EPA's tightening of the PM_{2.5} NAAQS resulted in the classification of more areas as "nonattainment" and in need of implementing new controls on particulate matter. States and local governments will be required to develop and implement new plans (SIPs) for addressing emissions in those areas that do not meet new standards. In a February 2006 advanced notice of proposed rulemaking (ANPR)¹¹⁷ outlining an implementation plan for the transition to the 2006 particulates standards, EPA indicated that it would be beneficial for states to consider control strategies that may be useful in attaining the 2006 revised PM_{2.5} NAAQS when developing their strategies for the 1997 PM_{2.5} standards.

On November 13, 2009, EPA published its final designations of 31 areas in 18 states, comprising 120 counties (89 counties and portions of 31 additional counties), for nonattainment of the revised 2006 *24-hour* PM_{2.5} standard.¹¹⁸ The final designations, based on 2006 through 2008 air quality monitoring data, include a few counties that would be designated nonattainment for PM_{2.5} for the first time, but the majority of the counties identified overlap with EPA's final nonattainment designations for the 1997 PM_{2.5} NAAQS.¹¹⁹ However, most of the 1997 PM_{2.5} nonattainment areas were *only* exceeding the annual standard; only 12 counties were exceeding both the *24-hour* and the *annual* standards. Thus, tightening the 24-hour standard resulted in an

¹¹³ For more information regarding of EPA's changes to the particulates NAAQS, see CRS Report RL33254, *Air Quality: EPA's 2006 Changes to the Particulate Matter (PM) Standards*, by Robert Esworthy and James E. McCarthy. Information can also be accessed on EPA's website at http://www.epa.gov/ttn/naaqs/standards/pm/s_pm_index.html.

¹¹⁴ Section 109(d)(1) of the CAA.

¹¹⁵ EPA's Advanced Notice of Proposed Rulemaking outlining an implementation plan for the transition to the January 17, 2006, proposed particulates NAAQS 71 *Federal Register* 61143-61233, October 17, 2006.

¹¹⁶ EPA, Air Quality Criteria for Particulate Matter, October 29, 2004. EPA, Review of the National Ambient Air Quality Standards for Particulate Matter: Policy Assessment of Scientific and Technical Information, OAQPS Staff Paper, Office of Air Quality Planning and Standards, EPA-452/R-05-005, July 2005. The EPA criteria document and staff paper can be available at http://www.epa.gov/ttn/naaqs/standards/pm/s_pm_cr.html.

¹¹⁷ 71 *Federal Register* 6718, February 9, 2006.

¹¹⁸ See footnote 38.

¹¹⁹ For detailed PM_{2.5} state/county geographical designation recommendations by EPA and those from individual states and tribes for the 1997 and for the 2006 PM_{2.5} NAAQS, see <http://www.epa.gov/pmdesignations>.

increased number of areas (and counties) being designated nonattainment based on exceedances of both the *24-hour* and the *annual* standard—150 counties nationally.¹²⁰

In December 2008, EPA had announced designation of 211 counties and portions of counties in 25 states as nonattainment areas for the 2006 PM NAAQS based on 2005-through-2007 data. Publication of a final designation rule for the 2006 PM_{2.5} NAAQS was delayed pending review by the agency under the current Administration.¹²¹ The review of the final designation rule, along with several other agency proposed and final actions introduced toward the end of the previous Administration, was initiated, in part, in response to a White House January 20, 2009, memorandum,¹²² and the Office of Management and Budget’s subsequent January 21, 2009, memorandum,¹²³ regarding regulatory review. During this review, EPA revised its designations based on more current monitoring data (calendar years 2006-2008).

EPA’s final designation rule became effective December 14, 2009 (30 days from the date of publication). Following formal designation, the states have three years to submit State Implementation Plans (SIPs), which identify specific regulations and emission control requirements that would bring an area into compliance.¹²⁴ States are required to meet the 2006 revised PM_{2.5} NAAQS no later than five years from the date of designation, unless granted an extension.¹²⁵ EPA projects that states will be required to submit SIPs in November 2012, and would have to meet the new PM_{2.5} standard in November 2014 (or 2019, if qualified for an extension).¹²⁶ As discussed earlier, states must be in compliance with the 1997 PM_{2.5} NAAQS by April 2010, unless granted an extension.¹²⁷

Given the continuing delays in implementing the 1997 NAAQS and the D.C. Circuit’s July and December 2008 decisions regarding the CAIR, some stakeholders advocated moving directly to implementation of the 2006 standards. However, the 2006 particulates NAAQS have faced challenges of their own. In December 2006, several states and industry, agriculture, business, and public advocacy groups separately petitioned the court to review the 2006 particulates

¹²⁰ See CRS Report R40096, 2006 National Ambient Air Quality Standards (NAAQS) for Fine Particulate Matter (PM_{2.5}): Designating Nonattainment Areas, by Robert Esworthy.

¹²¹ See EPA’s website, “Area Designations for 2006 24-Hour Fine Particulate (PM_{2.5}) Standards—December 2008 Area Status (Not Final Designations),” <http://www.epa.gov/pmdesignations/2006standards/documents/2008-12-22/12-08table.htm>.

¹²² Memorandum to Heads and Acting Heads of Executive Departments and Agencies from Rahm Emanuel, Assistant to the President and Chief of Staff, regarding Regulatory Review, January 20, 2009, 74 *Federal Register* 4435, January 26, 2009; the memorandum is also available at http://www.whitehouse.gov/omb/assets/information_and_regulatory_affairs/regulatory_review_012009.pdf.

¹²³ Memorandum to Heads and Acting Heads of Executive Departments and Agencies from Peter R. Orszag, Director, Office of Management and Budget, regarding Implementation of Memorandum Concerning Regulatory Review, January 21, 2009, http://www.whitehouse.gov/omb/assets/agencyinformation_memoranda_2009_pdf/m09-08.pdf.

¹²⁴ See EPA’s guidance on its website: “Area Designations for 2006 24-Hour PM_{2.5} NAAQS—Technical Information,” http://www.epa.gov/ttn/naaqs/pm/pm25_2006_techinfo.html.

¹²⁵ Under section 172(a)(2)(A) of the CAA, EPA may grant an area an extension of the initial attainment date for one to five years (in no case later than 10 years after the designation date for the area) if a state demonstrates that severe air quality conditions prevent achieving attainment within the five years after designation. A state requesting an extension must submit an implementation plan (SIP) by the required deadline that includes, among other things, sufficient information demonstrating that attainment by the initial attainment date is “impracticable.”

¹²⁶ See EPA’s estimated timeline for implementation of the 2006 24-Hour PM_{2.5} standard at <http://www.epa.gov/pmdesignations/2006standards/documents/2009-10-08/timeline.htm>.

¹²⁷ See footnote 125.

NAAQS.¹²⁸ A February 24, 2009, decision by the U.S. Court of Appeals for the District of Columbia Circuit granted the petitions in part, denying other challenges, and remanded the standards to EPA for further consideration.¹²⁹ While the court did not specifically vacate the 2006 PM standards, and their implementation will proceed, the decision and EPA's eventual actions have prompted renewed interest in PM NAAQS among members of Congress.

Delaying publication of the final area designations for the 2006 PM_{2.5} NAAQS delayed the expected effective date, which had been scheduled for April 2009.¹³⁰ The effective date for the final designations is December 14, 2009.

Current Periodic Review of the Particulates NAAQS

EPA's next round of the periodic review of the particulates NAAQS is under way. The agency announced its intention to accelerate the review, in part in response to the February 2009 D.C. Circuit court decision regarding the 2006 particulates NAAQS. EPA has indicated that it plans to propose any changes to the standards by February 2010 and has targeted October 2011 for final standards.¹³¹

Potential risk reduction estimates and initial staff recommendations reported in recently released draft EPA assessments¹³² suggest further strengthening of the NAAQS for fine particulates. The assessments include findings that indicate that more stringent annual *and* 24-hour PM_{2.5} standards could potentially reduce mortality risk from long-term exposure as well as provide protection from high peak concentrations. In an April 2010 review of EPA's draft assessments, members of the CASAC agreed that the evidence suggests the need for stricter PM_{2.5} standards to adequately protect human health.¹³³

The EPA's assessments and findings, and the issue of whether particulate NAAQS should be strengthened or not, will likely be subject to considerable comment and debate.

¹²⁸ The Court consolidated the cases at *American Farm Bureau Federation v. U.S. EPA*, No. 06-1410 (D.C. Cir. 2006).

¹²⁹ *American Farm Bureau Federation v. U.S. EPA*, No. 06-1410 (D.C. Cir., February 24, 2009).

¹³⁰ See EPA's guidance on its website, "Area Designations for 2006 24-Hour PM_{2.5} NAAQS - Technical Information," http://www.epa.gov/ttn/naaqs/pm/pm25_2006_techinfo.html.

¹³¹ See page 45220 of the EPA Proposed Rule: Federal Implementation Plans to Reduce Interstate Transport of Fine Particulate Matter and Ozone, or "Proposed Transport Rule," as published in 75 *Federal Register* 45210–45465, August 2, 2010.

¹³² EPA, Integrated Science Assessment for Particulate Matter (Final Report) (EPA/600/R-08/139F, December 2009), and Risk Assessment to Support the Review of the PM Primary National Ambient Air Quality Standards—External Review Draft (EPA 450/P-09-006, September 2009); 74 *Federal Register* 46589–46591, September 10, 2009. Both assessments are available at http://www.epa.gov/ttn/naaqs/standards/pm/s_pm_2007_fr.html. See also Policy Assessment for the Review of the PM NAAQS - First External Review Draft (EPA 452/P-10-003, March 2010), available at http://www.epa.gov/ttn/naaqs/standards/pm/s_pm_2007_pa.html.

¹³³ EPA Clean Air Science Advisory Committee (CASAC) Public Teleconference to review the Policy Assessment for the review of the Particulate Matter NAAQS (First Draft, March 2010), April 8–9 2009, <http://yosemite.epa.gov/sab/sabproduct.nsf/WebCASAC/recentadditions>. See also CASAC's *Deliberative Draft Letter on the Quantitative Health Risk Assessment for Particulate Matter (second External Review Draft)*, March 30, 2010, <http://yosemite.epa.gov/sab/sabproduct.nsf/WebCASAC/recentadditions>.

Congressional Action Related to Particulates NAAQS Implementation

Concerns regarding the potential impacts of the ozone and particulate standards have led to several attempts by Congress over the years to modify the implementation requirements.¹³⁴ Attempts in recent years were generally attached to larger pieces of legislation, such as the energy¹³⁵ and transportation bills, as well as proposed multi-pollutant bills to reduce emissions from coal-fired power plants. Although PM_{2.5} has not been one of the primary pollutants¹³⁶ specified in the multi-pollutant legislation previously considered, certain provisions of some of the bills could have potentially contributed to reducing PM_{2.5} concentrations.¹³⁷

The D.C. Circuit's July 2008 decision to vacate CAIR put into play again the issue of a multi-pollutant strategy with respect to the electric utility industry—a framework based on a consistent set of emissions caps implemented through emission trading. Such an approach would not resolve all the issues surrounding CAIR, and would raise issues of its own:¹³⁸

- Should multi-pollutant legislation supplement or be a substitute for the current regulatory regime?
- How stringent should the emission caps be?
- What is an appropriate schedule for their introduction?
- How should they relate to existing CAA provisions?
- Should carbon dioxide be included with SO₂, NO_x, and mercury control programs?
- Should requirements be limited to the electric utility industry?
- Should EPA be provided with the authority to implement CAIR or other cost-based, market-oriented approaches to address NAAQS?
- Should there be comprehensive revision to the CAA to address the full scope of ozone and PM_{2.5} NAAQS nonattainment and related issues, as well as other

¹³⁴ For a historical perspective, see CRS Report RL34057, *Ozone Air Quality Standards: EPA's March 2008 Revision*, by James E. McCarthy, and CRS Report RL33552, *Clean Air Act Issues in the 109th Congress*, by James E. McCarthy.

¹³⁵ See CRS Report RL32873, *Key Environmental Issues in the Energy Policy Act of 2005 (P.L. 109-58; H.R. 6)*, coordinated by Brent D. Yacobucci.

¹³⁶ Bills introduced in the 111th and previous Congresses generally focused on regulating three or four pollutants; three-pollutant bills addressing sulfur dioxide (SO₂), nitrogen oxides (NO_x), and mercury (Hg) emissions, and the four-pollutant bills added carbon dioxide (CO₂).

¹³⁷ During the 111th Congress, S. 2995, introduced February 4, 2010, would establish cap-and-trade programs for sulfur dioxide (SO₂) and nitrogen oxides (NO_x) from electric power plants and establish Maximum Achievable Control Technology limits for their emissions of mercury (see CRS Report R40145, *Clean Air Issues in the 111th Congress*, by James E. McCarthy). During the 110th Congress, five multi-pollutant bills were introduced. The proposed bills, S. 1168, S. 1177, S. 1201, S. 1554, and H.R. 3989, would have established a regulatory program to reduce the quantities of SO₂, NO_x, mercury (Hg), and carbon dioxide (CO₂) emissions from the electric generating sector. For a comparison of these legislative proposals, see CRS Report RL34018, *Air Quality: Multi-Pollutant Legislation in the 110th Congress*, by Larry Parker and John Blodgett. For a comparison of bills in the 109th Congress, including the Clear Skies bill, see CRS Report RL32755, *Air Quality: Multi-Pollutant Legislation in the 109th Congress*, by Larry Parker and John Blodgett.

¹³⁸ See CRS Report RL34589, *Clean Air After the CAIR Decision: Multi-Pollutant Approaches to Controlling Powerplant Emissions*, by James E. McCarthy, Larry Parker, and Robert Meltz.

pollutant emissions from coal-fired power plants, and emerging environmental issues such as climate change?

These questions and related issues related to the CAIR were at the center of discussion during a July 29, 2008, hearing held by the Senate Committee on Environment and Public Works Subcommittee on Clean Air and Nuclear Safety, and on July 22, 2010, the committee held a hearing on EPA's proposed alternative transport rule.¹³⁹

Congress could consider a more surgical legislative vehicle aimed specifically at providing EPA with the authority to implement some form of CAIR or other cost-based, market-oriented approaches to address NAAQS. The court's December 23, 2008, ruling and EPA's subsequent August 2010 proposed alternative transport rule seem to have lessened interest in such an approach. At the other extreme, Congress might consider a more comprehensive revision to the CAA to address not only ozone and PM_{2.5} NAAQS nonattainment, but also other pollutant emissions and emerging environmental issues such as climate change.

Conclusion

Implementation of the 1997 PM_{2.5} NAAQS impacts a number of counties throughout the United States. EPA's final nonattainment designations included 39 areas, comprising 205 counties within 20 states (and the District of Columbia) nationwide, with a combined population of almost 90 million. A number of concerns have been raised regarding the potential impacts, and numerous questions have been triggered regarding the specifics of the implementation process for the 1997 standards. Similar concerns are likely to stimulate debate as EPA and states encounter issues in the initial stages of implementing the PM_{2.5} NAAQS as revised in October 2006 and as the agency proceeds with its current review of the particulates NAAQS.

Already delayed considerably, implementation of the 1997 PM_{2.5} NAAQS faced further uncertainty as a result of the U.S. Court of Appeals for the D.C. Circuit's July 11, 2008, decision (*North Carolina v. EPA*)¹⁴⁰ that would have vacated the Clean Air Interstate Rule (CAIR).¹⁴¹ EPA projected that CAIR, in conjunction with other federal measures such as recent auto and truck emission standards, would be sufficient to demonstrate attainment in a large portion of monitored nonattainment counties by 2015, prior to the development and implementation of local measures. However, the court's subsequent December 23, 2008, ruling temporarily reinstating CAIR¹⁴² until EPA promulgates a replacement rule, allowed implementation of the 1997 PM_{2.5} NAAQS to continue in the interim. EPA anticipates finalizing the proposed alternative to CAIR published on August 2, 2010, in spring of 2011, eliciting additional concerns with respect to the ongoing implementation of the 1997 PM_{2.5} NAAQS in the interim.

EPA promulgated revisions to the NAAQS for particulate matter on October 17, 2006,¹⁴³ primarily a tightening of the 1997 standard for PM_{2.5}. The tightening of the PM_{2.5} standards¹⁴⁴

¹³⁹ Senate Committee on Environment and Public Works, Subcommittee on Clean Air and Nuclear Safety hearings: "EPA's Clean Air Interstate Rule (CAIR): Recent Court Decision and its Implications," July 29, 2008; "Oversight: EPA's Proposal for Federal Implementation Plans to Reduce Interstate Transport of Fine Particulate Matter and Ozone," July 22, 2010, <http://epw.senate.gov/public/index.cfm?FuseAction=Hearings.Home>.

¹⁴⁰ 531 F.3d 896 (D.C. Cir. 2008).

¹⁴¹ 42 U.S.C. 7401 et seq.

¹⁴² 550 F.3d 1176 (D.C. Cir. 2008).

¹⁴³ 71 *Federal Register* 61143-61233 (October 17, 2006).

¹⁴⁴ The new daily standard averaged over 24-hour periods is reduced from 65 µg/m³ to 35 µg/m³. 71 *Federal Register*

increased the number of areas in nonattainment, and areas already designated nonattainment under the 1997 standard may need to adopt more stringent control measures to reach attainment. SIPs for the new 2006 PM_{2.5} NAAQS will not be due until December 2012, and attainment will not be required before December 2014. Under the CAA, states are required to meet the new standard “as expeditiously as practicable,” but no later than five years from the effective date of final nonattainment designations, unless granted an extension.¹⁴⁵

Citing the historical delays associated with implementing the 1997 standards, some stakeholders have advocated leapfrogging to implementation of the 2006 standards instead. However, opponents contend that an approach relying on the schedule for the 2006 revised particulates NAAQS would further delay the projected benefits of reducing exposures to PM_{2.5}. Delays in finalizing the nonattainment designations for the 2006 PM_{2.5} NAAQS delayed the effective date of these designations, and subsequently implementation. In addition, the 2006 revised particulates NAAQS have sparked their own controversies, and judicial challenges have been upheld in part (other challenges were denied) by the court and remanded to the EPA for reconsideration.¹⁴⁶ While the court did not specifically vacate the 2006 PM standards and their implementation will proceed, EPA’s actions in response to the decision could have implications in the future.¹⁴⁷ In part, in response to the court’s decision, EPA initiated the next round of review of the PM NAAQS, and has announced its intent to expedite that review.

Although 2006-2008 air quality data indicate that 19 of the 39 nonattainment areas for 1997 PM_{2.5} NAAQS have come into attainment, there are a number of states and cities that remain in nonattainment. Deadlines for states to submit their SIPs for the 1997 PM_{2.5} NAAQS have elapsed, as has the April 5, 2010, deadline for reaching attainment (unless granted an extension). In light of these expired deadlines and given the many issues surrounding the particulates NAAQS in general, the final phase of implementing the 1997 PM_{2.5} NAAQS will likely remain an issue of considerable debate for many stakeholders and interest groups, as well as Congress.

61143-61233 (October 17, 2006).

¹⁴⁵ See CRS Report R40096, 2006 National Ambient Air Quality Standards (NAAQS) for Fine Particulate Matter (PM_{2.5}): Designating Nonattainment Areas, by Robert Esworthy.

¹⁴⁶ American Farm Bureau Federation v. U.S. EPA, No. 06-1410 (D.C. Cir., February 24, 2009).

¹⁴⁷ See CRS Report RL34762, *The National Ambient Air Quality Standards (NAAQS) for Particulate Matter (PM): EPA’s 2006 Revisions and Associated Issues*, by Robert Esworthy and James E. McCarthy.

Appendix. Implementation of the 1997 PM_{2.5} NAAQS: Timeline and Delays

Because of legal challenges, the lack of a national monitoring network, and other factors, implementation of the 1997 PM_{2.5} NAAQS has been delayed repeatedly since it was promulgated. The timeline presented in **Table A-1** below reflects the most recent key milestone dates for implementing the 1997 PM_{2.5} NAAQS, including actual completions. These milestones are driven primarily by statutory requirements. It follows an EPA milestone schedule outlined in an April 21, 2003, memorandum to EPA regional administrators that also provided the nonbinding guidance for implementation of the PM_{2.5} area designations.¹⁴⁸ Recognizing potential efficiencies associated with states and tribes being able to harmonize control strategies, the initial PM_{2.5} schedule was intended to be similar to that for the eight-hour ozone program.

Table A-1. Milestone Chronology for Implementation of the 1997 PM_{2.5} NAAQS

Target Date	1997 PM _{2.5} NAAQS Milestones
February 2004 (completed)	State-tribal area designation recommendations (based on 2000-2002 monitoring data)
June-July 2004 (completed)	EPA notifies states and tribes regarding modifications to their recommendations
January 5, 2005 (completed) (70 <i>Federal Register</i> 944)	EPA promulgates final area designations (required one year after states and tribes make recommendations)
February 2005 (completed November 1, 2005) (70 <i>Federal Register</i> 65984)	EPA proposes PM _{2.5} implementation rule
April 5, 2006 (one year after the final designation April 5, 2005 effective date)	States with new transportation projects submit conformity determination within one year of the effective date of nonattainment designation
Mid-2007 (completed April 25, 2007)	EPA promulgates final PM _{2.5} implementation rule
April 2008 (3 years after final area designations effective date)	States and tribes were to submit revised implementation plans (SIPs) to achieve PM _{2.5} compliance in nonattainment areas
April 2010-2015 (5-10 years after final area designations effective date)	NAAQS statutory compliance deadline for attainment

Source: Prepared by the Congressional Research Service based on U.S. Environmental Protection Agency fact sheets and guidance documents, and relevant *Federal Register* notices.

The PM_{2.5} NAAQS requirement for three years of monitoring data to determine whether areas were meeting the established limits was one factor responsible for delaying implementation. Comprehensive monitoring data sufficient to make this determination and the attainment designations were not available in 1997. Recognizing this dilemma, in the 1998 Transportation Equity Act for the 21st Century (TEA-21; P.L. 105-178, Title VI), Congress revised the statutory deadline requirements for the new NAAQS, predicated on a previously released EPA Interim Implementation Policy. TEA-21 required states to submit designation recommendations within one year after receipt of three years of data meeting defined federal protocols, and required EPA to promulgate designations within one year after state recommendations were due, but not later than December 31, 2005.

¹⁴⁸ EPA memorandum, April 21, 2003, from the Office of Air and Radiation Assistant Administrator Jeffrey R. Holmstead to EPA Regional Administrators, available at http://www.epa.gov/ttn/naaqs/pm/pm25_guide.html.

As discussed earlier in this report, operation of the network of monitors was phased in from 1999 through 2000, making three-year monitoring data available at different points, depending on area location. Rather than a staggered designation schedule, which would likely have hampered cross-coordination of implementation plans, EPA proposed a single date for state and tribal recommendations and final EPA designations. The deadlines of February 15, 2004, for governors to submit their PM_{2.5} designation recommendations and December 31, 2004, for EPA to promulgate designations for each state, were the result of Congress amending the CAA in the FY2004 omnibus appropriations (P.L. 108-199).

In addition to the delay in establishing a monitoring network, the 1997 NAAQS standards were challenged in District Court by the American Trucking Associations, the U.S. Chamber of Commerce, and several other state and business groups. An initial May 1999 opinion by the District Court partially in favor of the plaintiffs was reversed by the Supreme Court in February 2001.¹⁴⁹

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¹⁴⁹ United States Court of Appeals for the District of Columbia Circuit, argued December 17, 1998; decided May 14, 1999 (No. 97-1440). *American Trucking Associations, Inc., et al., Petitioners v. United States Environmental Protection Agency*; *Whitman v. American Trucking Associations*, U.S. Supreme Court, No. 99-1257 and No. 99-1426, February 27, 2001 (121 S. Ct. 903). See CRS Report RS20860, *The Supreme Court Upholds EPA Standard- Setting Under the Clean Air Act: Whitman v. American Trucking Ass'ns*, by Robert Meltz and James E. McCarthy.